WSI Packing Instructions

I. Purpose:

This list describes the shipping method used by MPL, which has been found to be reasonably safe. The list is being provided for guidance to the ARM TWP team, at their request. The WSI, for transport, ships in 5 reusable wooden shipping crates. The crates were designed around a fork-liftable pallet with hard and/or soft foam incorporated to absorb shock and high frequency. Floating decks with vibration isolators are used in the larger crates. The crates conveniently unpack with the removal of the hex head bolts that hold the top and sides of the crate together. It is recommended that one use a Makita cordless power drill (or other power driver) and a 7/16" drive socket to facilitate in the insertion of the bolts. (The large crates use T-nuts and bolts on the tops and sides, and lag bolts at the base; the boxes use T-nuts and bolts for the lid). Generally, it is easiest to first place the sides of the crate on, and then the lid. The crates contain the following items:

1. Blue Box computer rack (requires indoor environment location)
2. WSI White Box environmental housing (located outside)
3. WSI Camera Housing (goes in environmental housing)
4. Occultor (goes in environmental housing)
5. Cabling and miscellaneous.

II. Cautions and Hazards:

None.

III. Requirements:

None.

IV. Procedure:

A. Start a List:

1. Make a copy of the packing list at the end of this note, so you can be prepared to check off each item as it goes in its box.

B. Power-down Sequence:

1. If the program is running, type the T (for Tape) key, and follow the instructions for removing, labeling, and storing the tapes.
2. Terminate the RunWSI program by pressing the X key. In order to close all open sessions using the Window List, press the CTRL and ESC keys simultaneously. A window showing all open sessions is displayed. Use the up or down arrow key to highlight the RunWSI title in the Window List.

Click the third mouse button to close the window. Repeat this procedure for all titles in the Window List, except for the Desktop title. Answer yes to each confirmation prompt. After closing all windows and sessions follow the shut down procedure shown in figure 1.

3. Turn off the upper switch on the SCSI rack (TWP and NSA only).
4. Turn off the computer. This should also shut down the monitor.
5. Turn the Sensor ACP power off.
6. Turn the Occultor ACP local enable key on and put the local switches into local. Move the arc drive to 10 degrees, and the trolley drive to 45 degrees.
7. Turn the Occultor ACP power off.
8. Unplug the Blue Box power cord from the UPS.
9. Unplug the large diameter orange power cord from the power strip or UPS.
10. Unplug small diameter orange power cord from the UPS.

C. Disconnect the Cable Bundle at the Blue Box:

1. Disconnect Occultor ACP 6402-02-J1 from port 6402-02-P1 on the Occ ACP.
2. Disconnect Occultor ACP 6402-02-J2 from port 6404-02-P2 on the Occ ACP.
3. Disconnect Sensor ACP 6401-02-J1 from port 6401-02-P1 on the Sensor ACP.
4. Disconnect Sensor ACP 6401-02-J2 from port 6401-02P2 on the Sensor ACP.
5. Disconnect the camera cable labeled “connect to interface card” from the upper port of the fourth card from the left in the back of the computer (computer control card).
6. Remove the cable bundle from the blue box via the sandwich port provided below the rear door of the Blue Box.

D. Disconnect Cable Bundle from Environmental Housing:

1. Open the East door of White Box.
2. Remove the black foam holding in the lexan window. Remove window and set it and the foam aside in a safe place.
3. Unplug the black power cord labeled “camera electronics unit” from the small orange power cord.

4. Unplug the following from the 3 plugs on the large orange power cord:
   - The yellow-ended plug from the thermal electric cooler labeled "TE Cooler"
   - The black plug labeled "Meter Assembly"
   - The yellow-ended plug from the coolant circulation pump labeled "Pump"
5. The camera labeled "Cable, inte cntrlr CE200a" snakes up to the upper housing chamber and connects to the bottom port of the camera electronics unit (gray box); the port is labeled "Controller." Unplug this connector, and bring it down into the bottom of the environmental housing.
6. Disconnect the large gray Sensor ACP cable 6501-03-J1 from port 5601-03-P1 on the environmental housing bulkhead (in he lower env hsg chamber).
7. Disconnect the large gray Filter cable 5601-03-J2 from port 6501-03-P2 on the environmental housing bulkhead.
8. Disconnect the small gray cable 6501-03-J3 from port 6501-03-P3 on the environmental housing bulkhead.
9. Disconnect the small gray cable 6501-030J4 from port 6501-03-P4 on the environmental housing bulkhead.
10. Remove the small "anti-bug" plate from the hole in the bottom through which the cables run and place it in the housing for shipment.
11. Feed the cable bundle out through the bottom plate and then out through the side holes located at the base of the housing on the right hand side.

E. Pack the 100 ft. Bundle Cable:

1. Coil the cable bundle into a figure 8 formation. This avoids kinks in the bundle. It should be loose enough so that it is easy to work with, i.e. it can be slung over the shoulder if desired for carrying up platforms at the site.
2. Open the Cable box, saving bolts in a baggie. Remove any loose packing material and pack the cable bundle in the cable box.

F. Prepare Blue Box for Crating:

1. Unplug the keyboard. Wrap it carefully in foam secured with fiber tape and pack it in the cable box.
2. Remove the keyboard rest from the front of the door of the blue box, wrap it in foam secured with fiber tape, and pack in the cable box.

3. Unplug the WWV clock from the 115V plug-in terminal strip on the floor of the blue box.
4. Disconnect the cable from the clock RS232 port, coil it and tuck it into the side of the blue box.
5. Disconnect the ethernet cable and terminate the ethernet card.
6. Disconnect the clock antenna from the back of the clock.
7. Carefully wrap the click in bubble wrap, tape it, and pack it in the cable box.
8. Disconnect the mouse cable from the computer, wrap the mouse in bubble wrap, tape it, and pack it in the cable box.
9. Verify that the monitor power connection on the back of the monitor is left connected.
10. Verify the following connections on the computer back are left in the following configuration:
    - Switch is on 1 i.e. “on”
    - Top plug under switch (power in) is seated
    - Second plug under switch (power out to monitor) is seated
    - Monitor signal cable on top port, left-most board (CPU) is seated
    - White plug for peripheral SCSI enclosure on second card from left (SCSI) is seated
11. Verify that the following connections on the Accessory Control Panel (ACP) backs are left connected:
    - Occultor ACP trolley ribbon cable 6402-02-J3 is seated in ACP receptor 6402-02-P3
    - Occultor ACP arc ribbon cable 6402-02-J4 is seated in ACP receptor 6402-02-P4
    - Occultor ACP power cord 6402-02-J5 is seated in ACP power receptor 6402-02-PD
    - Sensor ACP ribbon cable 6401-02-J3 is seated in ACP power receptor 6401-02-P3
    - Sensor ACP ribbon cable 6401-02-J4 is seated in ACP power receptor 6401-02-P4
    - Sensor ACP poser cord 6401-02-J5 is seated in ACP power receptor 6401-02-P5
12. Verify that the following connections on Peripheral SCSI Enclosure (Exabyte rack) are left connected:

- White SCSI input cord on upper left port is seated
- Termination plug in lower port is seated
- Power cable in lower plug is seated

13. Place white etha (rigid) foam around the monitor, to hold it RIGIDLY so that it cannot slip sideways, vertically, or front to back. THIS STEP IS VITAL!
14. Tuck all cabling on back of the rack in neatly, taping if necessary for safe shipment.
15. Inspect the blue box to verify that it appears to be safe to ship.
16. Remove all keys and put in a baggie.
17. Shut the front door and lock it.
18. Tape the baggie containing the keys to the inside of the blue box in back.
19. Secure the back door of the Blue Box (OK to leave unlocked).

G. Crate the Blue Box:

1. If preparing for overseas shipment, wrap the blue box in commercial stretch wrap, including going under the box, so that it is sealed against moisture. (Or, if in San Diego, ask MPL to do this.)
2. Unlock the wheel locks and place the blue box on its shipping pallet, i.e. the base of crate 1, with the front toward the side of the base labeled “front.”
3. Adjust the position of the blue box on the base so that the sides of Crate 1 cab be set in place. Note labeling on the sides base, and op to help you find which is front etc. The etha foam should fit snugly against the sides of the blue box to hold it tightly in place. If they don’t, thin layers of soft foam can be added as necessary.
4. Hold the sides of the crate in place by inserting the bolts in the T-nuts loosely. Make sure none of the T-nuts have fallen out, and replace them with spares as necessary.
5. Prepare packing slips as required and insert in the top of the box.
6. Place the top of the box on in correct orientation and snug down the rest of the bolts, including the lag bolts which secure the sides to the bottom.
7. Label the outside of the box with shipping addresses, packing slips, fragile stickers, and “UP” stickers.

H. Disconnect Camera Electrical and Coolant Lines:

1. Open the west door of the environmental housing.
2. Remove the black foam holding in the lexan window, remove the window, and set it and the foam aside in a safe place.
3. Remove the desiccant, seal it in plastic so it's airtight, wrap it and pack it in the cable box.
4. Remove the saddle to hold the desiccant from the top of the camera electronics unit, wrap in bubble wrap, and pack in the cable box.
5. Disconnect the two nitrogen sensor cable connectors; one leads from the sensor on the bottom of the camera housing, and the other is part of the cable bundle on the housing shelf. Both are labeled "Pressure Sensor."
6. Disconnect the temperature cable connector. This is a smaller cable labeled "Camera Hsg TEMP" which connects to the bottom of the camera housing.
7. Disconnect the cable for the filter changer and shutter; this connector, labeled "Filter Changer," should be disconnected from the bottom of the camera housing.
8. Find the Camera grounding plug, a small blue plug, which is stored in the environmental housing. This will be used in the next step.
9. Find the gray camera cable which comes from the Camera Electronics Unit (CEU) and is labeled Cable, Camera Head CH250" and is connected into the back of the camera. Remove this cable and IMMEDIATELY attach the camera grounding plug.
10. Find the two tygon tube coolant fluid lines, and note the disconnects near the camera. Only the female connectors have a liquid cutoff (in order to avoid too much pressure loss through cutoffs), so you will need to be prepared for some leaking. Have plenty of paper towels under the tubing if there is still water in the tubes.
11. Disconnect the two tygon tube coolant fluid lines to the quick disconnect lines emanating from the base of the CCD camera. Connect that two tubes coming out of the back of the camera to each other.
12. Using the remaining male connector, drain the liquid from the reservoir, then connect to the remaining female connector. Clean up any spilled water.

I. Remove the Camera Housing from the Environmental Housing:

1. Open the camera shipping box and remove any spare packing material.
2. Remove the 8 bolts, which secure the occultor and then remove the sunshade and set aside.

3. Remove the two rings of black insulation over the camera housing flange. The smaller will be shipped in the camera housing box and the large will be shipped with the environmental housing.
4. Unscrew the nylon screws, which hold down the flange of the camera housing to the environmental housing. Save these in the baggie marked “camera housing.”
5. With your arms inside the environmental housing, lift the camera housing up out of the lid and have a partner lift it on out. Be careful not to hit the connectors underneath or to mar the dome.
6. Disconnect the coolant disconnects, drain the camera, and reconnect the disconnects.
7. Remove the four flange pieces from the camera housing lid if they are on it and place them in the baggie marked “Cmg Hsg lid” along with their screws. Attach the camera housing lid to the camera using the thumb screws which should be in the baggie.
8. Lower the camera into the camera shipping box, holding it by the flange, not the lid.
9. Lower the camera into the camera shipping box, holding it by the flange, no the lid.
10. Pack in the baggie with the camera housing screws and the baggie with the lid materials. Pack foam around and above the lid to secure the camera.
11. Seal the camera shipping box and add shipping documents and labels to the inside and outside as noted in Step G.
12. Verify that the red rubber ring is seated on the to of the nylon supporting ring in the top plate of the environmental housing.

J. Disconnect Occultor from Environmental Housing Electrically:

1. On South side, disconnect cable labeled “Arc drive” from the left0hand connector plug on the bottom of the occultor arc drive housing.
2. On South side, disconnect cable labeled “Limit On/Off” from the right-hand connector plug on the bottom of the occultor arc drive housing.
3. On North side, disconnect cable labeled “Trolley drive” from the connector plug on the round trolley drive housing.
4. On North side, disconnect cable labeled “Limit switch” from the connector plug on the limit switch housing which is labeled “North.”
5. Bubble wrap these four short cables and tuck them in on the sides between the housing and the housing sun shield. Tape them in place for shipment.

K. Install the Arc Drive Dummy Plate on the Occultor Base Plate Frame:

1. Place a wooden shim snugly between the arc counter weight and the uppermost one-inch diameter stand-offs to prevent the arc sub-assembly from dropping down when the arc drive base plate is removed.
2. Use 6” deep throat “C” clamps, or their equivalent, to clamp the arcs snugly, in their existing position, to the in-board support plate. This plate is at the in-board end of the stainless steel drive shaft and will remain in place during his procedure. Try to avid putting cross torque on the drive shaft bearing while clamping the arcs in position.
3. The arc drive sub-assembly base plate is attached to four one-inch diameter round stand-offs with four 8-32 stainless steel shoulder cap screws. Loosen these four screws until they protrude from their countersinks about 1/16 inch. Do not remove these screws completely at this point since they will help maintain alignment while the drive shaft is disconnected.
4. Immediately adjacent to the inboard side of the arc drive baseplate is the retaining clamp on the stainless drive shaft. The clamp is held tight by three 8-23 cap screws.
5. Loosen the screws to release the drive shaft clamp.
    - The drive shaft is keyed inside the clamp to minimize backlash and slippage. If the clamp does no adequately release, one may remove the clamping screws, insert a thin shim into the clamping slot and use the clamping screws to slightly spread the clamp.
6. With the four stand-off screws and the three clamping screws loose, the arc drive sub-assembly is ready for removal. Using a hard wood block against the inside of the arc drive base plate immediately adjacent to the shaft clamp, tap the base plate directly outboard away from the clap. Tap parallel with the drive shaft. Tap briskly until the base plate moves slightly outboard (not to exceed 1/16 inch).
7. Once the arc drive base plate separates slightly from the clamp, i.e. approximately 1/16 inch, remove the four stand-off screws, grasp the arc drive sub-assembly and gently tap outward until the keyed shaft protruding from the arc drive sub-assembly and gently tap outward until the keyed shaft protruding from the arc drive base plate completely clears the end of the stainless steel clamp. At this point, the disassembly procedure is complete.
8. Immediately upon completing disassembly, install the dummy support plate, using the four one inch long 8-32 machine screws provided. These attach the dummy plate to the four stand-offs previously used to

support the arc drive base plate. Insert the plastic slug through the dummy plate into the stainless steel clamp. Tape slug in place.

9. Remove shims and clamps and brace the arc in the 10 degree shipping position using etha foam inserts, with soft foam to fill in as necessary.

L. Remove Occultor Assembly from Environmental Housing (White Box):

1. Remove the top of the occultor shipping box and remove extra packing material, carefully saving both the bolts and packing material.
2. Lift the occultor by the large circular occultor base plate on top of the wooded support structure in the occultor box. Bolt down to the T-nuts on the underside of the support.
3. The arc should be laying on the etha foam support. Pad with soft foam as necessary. Then, hold down the arcs with the bungie cords that hook onto the bottom of the box.
4. Wrap the arc drive carefully in foam with fiber tape and pack into the occultor box. Pack it in foam so that it will not rattle around in the box.

M. Prepare White Box for Shipment:

1. Verify that the insulating foam and 4 nylon stand off blocks are positioned such that the hold down bolts line up the top plate of the White Box.
2. Replace the small round piece of insulation removed in Step 1.
3. Replace the black sunshade plate on the top of the housing, using the bolts saved in Step 1.
4. Loosen the plastic-coated tie-down cables by loosening the turnbuckles. Remove the cables (by loosening a wire nut at each end). Remove the screw eyes from the platform and screw eyes from the sides of the environmental housing. Store all these together in a sack and pack in with the cable box.
5. Replace the four vertical screw eyes in the corners; these are used to lift the white box and are stored in the baggie marked “white box corner hardware.”
6. Inspect the interior of the environmental housing to verify that it appears to be safe for shipping.
7. Replace the lexan on both sides of the housing, replacing the black foam and being sure the foam is not in the “keep unobscured” region.
8. Shut both doors to the housing.

9. Loosen the bolts on the top of each leveling feet where it is snug against the bottom of the environmental housing. Then, screw each let n to its shortest configuration. Retighten the bolts.
10. Inspect the exterior of the environmental housing to verify that it appears to be safe for shipping.

N. Pack White Box:

1. Find the pallet, sides, and top for Crate 2, which houses the White Box.
2. Place the pallet or base near the white box with the side labeled “front” facing the same direction as the front door. (Verify this because it may not be correction-check which way it will fit.)
3. Briefly lift the White Box up and pull the pallet under it.
4. Center the white box on the pallet, seal it up, and label it using the same procedures noted in Section G.
5. Bring leveling legs to lowest height and place 2 X 4 between the legs so they support the weight of the environmental housing.

O. Pack the Clock Antenna:

1. Disconnect the clock antenna from the roof (or wherever it is).
2. Coil up the cable and pack it in the cable box.

P. Clean-up:

1. Check the packing list. Place in any spares listed on the list and verify that everything is packed.
2. Be sure the occultor is well protected in its box, adding padding if necessary. Seal and label the occultor shipping box as noted in Step G.
3. Seal and label the cable shipping box as noted in Step G.
4. Using a fork lift, place the crates where they will be ready for shipment.

V. References:

None.

VI. Attachments:

1. WSI Packing List

ATTACHMENT 1: WSI PACKING LIST

Box 1:

- Computer rack (blue box) crate
- Monitor (well locked for shipment)
- Computer
- 2 accessory control panels
- SCSI rack
- Blue eye bolts in bottom
- Various cables pre-attached

Box 2:

- Environmental housing crate
- Completed housing with a variety of parts pre-installed, including
- TECA cooler
- Pump and coolant system
- Reservoir
- Temperature and flow rate sensors
- Insulation and sun shield on top

Box 3:

- Camera housing crate
- Camera housing subassembly includes sensor, lens, filters, etc.
- Camera housing lid
- Baggie with screws for adapting lid for field configuration
- Baggie with screws for attaching camera housing

Box 4:

- Occultor crate
- WSI occultor
- Arc drive subassembly plate

Box 5:

- Cable and miscellaneous crate
- Cable bundle
- WWW clock
- keyboard and monitor wipes
- spare grommet rubber
- spare cam termination plug

Keyboard reset
Keyboard
Deionized water
Alcohol
Desiccant
Desiccant saddle
Nitrogen (may not be shipped to TWP)
Camera short cable
Tie-down cables with screw-eyes, turn buckles, wire nuts
Antenna cable
Spare tape for packing next time
Spare nuts and bolts
Pen and baggies for storing bolts from boxes etc.
Spare exabyte tapes
Spare lens tissues and lens duster
Spare desiccant
Funnel
Spare 0-ring
Spare dome
Spare nuts and bolts
Lens cover (for use if lens has be to be changed)
Spare filters for computer rack

spare CPU (on original MPL installation only)
spare hard disk (on original MPL installation only)
spare DIO card (on original MPL installation only)

<u>Additional Equipment Used by Field Team</u>:

Tool kit
Spare black tie downs
Compass and levels
Rope
Square for providing shadow at LAN